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AND REASON
Evaluating 50 Years
of Bigfoot Evidence
Cripplefoot
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BIGFOOT
Bigfoot at 50
Evaluating a Half-Century
of Bigfoot Evidence
The question of Bigfoot's existence comes down to the claim that "Where theres smoke there's fire. The evidence suggests that there are enough sources of error that there does not have to be a hidden creature lurking amid the unsubstantiated cases.
BENJAMIN RADFORD
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Though sightings of the North American Bigfoot date back to the 1830s (Bord 1982), interest in Bigfoot grew rapidly during the second half of the twentieth century. This was spurred on by many magazine articles of the time, most seminally a December 1959 True magazine article describing the discovery of large, mysterious foot-prints the year before in Bluff Creek, California.
A half century later, the question of Bigfoot's existence

remains open. Bigfoot is still sought, the pursuit kept alive by a steady stream of sightings, occasional photos or footprint finds, and sporadic media coverage. But what evidence has been gathered over the course of fifty years? And what conclusions can we draw from that evidence?
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Most Bigfoot investigators favor one theory of Bigfoot's origin or existence and stake their reputations on it, sniping at others who don't share their views. Many times, what one investigator sees as clear evidence of Bigfoot another will dismiss out of hand. In July 2000, curious tracks were found on the Lower Hoh Indian Reservation in Washington state. Bigfoot tracker Cliff Crook claimed that the footprints were "for sure a Bigfoot," though Jeffrey Meldrum, an associate professor of biological sciences at Idaho State University (and member of the Bigfoot Field Research Organization, BFRO) decided that there was not enough evidence to pursue the matter (Big Disagreement Afoot 2000). A set of tracks found in Oregon's Blue Mountains have also been the source of controversy within the community. Grover Krantz maintains that they constitute among the best evidence for Bigfoot, yet longtime researcher René Dahinden claimed that "any village idiot can see [they] are fake, one hundred percent fake" (Dennett 1994).
And while many Bigfoot researchers stand by the famous 16 mm Patterson film (showing a large manlike creature crossing a clearing) as genuine (including Dahinden, who shared the film's copyright), others including Crook join skeptics in calling it a hoax. In 1999, Crook found what he claims is evidence in the film of a bell-shaped fastener on the hip of the alleged Bigfoot, evidence that he suggests may be holding the ape costume in place (Dahinden claimed the object is matted feces) (Hubbell 1999).
Regardless of which theories researchers subscribe to, the question of Bigfoot's existence comes down to evidence- and there is plenty of it. Indeed, there are reams of documents about Bigfoot-filing cabinets overflowing with thousands of sighting reports, analyses, and theories. Photographs have been taken of everything from the alleged creature to odd tracks left in snow to twisted branches. Collections exist of dozens or hundreds of footprint casts from all over North America. There is indeed no shortage of evidence.
The important criterion, however, is not the quantity of the evidence, but the quality of it. Lots of poor quality evidence does not add up to strong evidence, just as many cups of weak coffee cannot be combined into a strong cup of coffee.
Bigfoot evidence can be broken down into four general types: eyewitness sightings, footprints, recordings, and somatic samples (hair, blood, etc.). Some researchers (notably Loren Coleman 1999) also place substantial emphasis on folklore and indigenous legends. The theories and controversies within each category are too complex and detailed to go into here. I present

merely a brief overview and short discussion of each; anyone interested in the details is encouraged to look further.

Benjamin Radford has been to the area of Bigfoot and wildman sightings in North and Central America, and was interviewed on mysterious creatures for The Ultimate Ten Mysteries, which appeared on The Learning Channel. He is co-author of Hoaxes, Myths, and Manias: Why We Need Critical Thinking, to be published by Prometheus Books later this year.

Figure 1. Casts from two alleged Bigfoot encounters. The cast on the left is from a Louisiana Bigfoot, the one on the right is from California. Photo by Benjamin Radford.

1. Eyewitness Accounts

Eyewitness accounts and anecdotes comprise the bulk of Bigfoot evidence. This sort of evidence is also the weakest. Lawyers, judges, and psychologists are well aware that eyewitness testimony is notoriously unreliable. As Ben Roesch, editor of The Cryptozoological Review, noted in an article in Fortean Times, "Cryptozoology is based largely on anecdotal evidence. [W]hile physical phenomena can be tested and systematically evaluated by science, anecdotes cannot, as they are neither physical nor regulated in content or form. Because of this, anecdotes are not reproducible, and are thus untestable; since they cannot be tested, they are not falsifiable and are not part of the scientific process.... Also, reports usually take place in uncontrolled settings and are made by untrained, varied observers. People are generally poor eyewitnesses, and can mistake known animals for supposed cryptids [unknown animals] or poorly recall details of their sighting.... Simply put, eyewitness testimony is poor evidence" (Roesch 2001).

Bigfoot investigators acknowledge that lay eyewitnesses can be mistaken, but counter that expert testimony should be given much more weight. Consider Coleman's (1999) passage reflecting on expert eyewitness testimony: "[E]ven those scientists who have seen the creatures with their own eyes have been reluctant to come to terms with their observations in a scientific manner." As an example he gives the account of "mycologist Gary Samuels" and his brief sighting of a large primate in the forest of Guyana. The implication is that this exacting man of science accurately observed, recalled, and reported his experience. And he may have. But Samuels is a scientific expert on tiny fungi that grow on wood. His expertise is botany, not identifying large primates in poor conditions. Anyone, degreed or not, can be mistaken.

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2. Footprints

Bigfoot tracks are the most recognizable evidence; of course, the animal's very name came from the size of the footprints it leaves behind. Unlike sightings, they are physical evidence: something (known animal, Bigfoot, or man) left the tracks. The real question is what the tracks are evidence of. In many cases,

the answer is clear: they are evidence of hoaxing.
Contrary to many Bigfoot enthusiasts' claims, Bigfoot tracks are not particularly consistent and show a wide range of variation (Dennett 1996), Some tracks have toes that are aligned, others show splayed toes. Most alleged Bigfoot tracks have five toes, but some casts show creatures with two, three, four, or even six toes (see figure 1). Surely all these tracks can't come from the same unknown creature, or even species of creatures.
Not all prints found are footprints, though. In September 2000, a team of investigators from the Bigfoot Field Research Organization led an expedition near Mt. Adams in Washington state, finding the first Bigfoot "body print," which if authentic-is arguably the most significant find in the past two decades. The Bigfoot, according to the team, apparently made the impression when it laid on its side at the edge of a muddy bank and reached over to grab some bait. This of course raises the question as to why the animal would make such an odd approach to the food, instead of simply walking over to it and taking it. As the log of the expedition reads, “One explanation is immediately apparent-the animal did not want to leave tracks. ." (BFRO 2000). This explanation fails on its own logic: If the Bigfoot (or whatever it was) was so concerned about not leaving traces of its presence, why did it then leave a huge fifteen-square-foot imprint in the mud for the team to find?'
3. Recordings
The Patterson Film
The most famous recording of an alleged Bigfoot is the short 16 mm film taken in 1967 by Roger Patterson and Bob Gimlin. Shot in Bluff Creek, California, it shows a Bigfoot striding through a clearing (see figure 2). In many ways the veracity of the Patterson film is crucial, because the casts made from those tracks are as close to a gold standard as one finds in cryptozoology. Many in the Bigfoot community are adamant that the film is not-and, more important-cannot be a hoax. The question of whether the film is in fact a hoax or not is still open, but the claim that the film could not have been faked is demonstrably false.
Grover Krantz, for example, admits that the size of the creature in the film is well within human limits, but
that
argues
the chest width is impossibly large to be human. "I can confidently state that no man of that stature is built that broadly," he claims (Krantz 1992, 118). This assertion was examined by two anthropologists, David Daegling and Daniel Schmitt (1999), who cite anthropometric literature showing the "impossibly wide" chest is in fact within normal human variation. They also disprove claims that the Patterson creature walks in a manner impossible for a person to duplicate.
The film is suspect for a number of reasons. First, Patterson told people he was going out with the express purcapturing a Bigfoot on camera. In the intervening

of
pose
thirty-five years (and despite dramatic advances in technology
and wide distribution of handheld camcorders), thousands of
in search of Bigfoot and come back empty-
people have gone
handed (or with little but fuzzy photos). Second, a known
Bigfoot track hoaxér claimed to have told Patterson exactly
where to go to see the Bigfoot that day (Dennett 1996).
Third, Patterson made quite a profit from the film, including
publicity for a book he had written on the subject and an
organization he had started.
on
Figure 2. A frame from the film shot by Roger Patterson in Bluff Creek, California, in 1967. The subject is said to be a female Bigfoot
In his book Bigfoot, John Napier, an anatomist and anthro-
pologist who served as the Smithsonian Institution's director
of primate biology, devotes several pages to close analysis of the
Patterson film (pp. 89-96; 215-220). He finds many prob-
lems with the film, including that the walk and size is consis-
tent with a man's; the center of gravity seen in the subject is
essentially that of a human; and the step length is inconsistent

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with the tracks allegedly taken from the site. Don Grieve, 'an
anatomist specializing in human gait, came to the conclusion
that the walk was essentially human in type and could be made
by a modern man. Napier writes that "there is little doubt that
the scientific evidence taken collectively points to a hoax of
some kind."
Figure 3. Bigfoot allegedly photographed on July 11, 1995, by forest patrol officer at Wild Creek in Mount Rainier foothills, Washington State.
Other films and photos of creatures supposed to be Bigfoot
have appeared, perhaps best-known among them the Wild
Creek photos allegedly purchased by Cliff Crook of Bigfoot
Central from an anonymous park ranger (see figure 3).
Bigfoot Voices
One of the more interesting bits of "evidence" offered for the
existence of Bigfoot is sound recordings of vocalizations. One
company, Sierra Sounds, markets a CD called "The Bigfoot
Recordings: The Edge of Discovery." Narrated by Jonathan
Frakes (an actor who also narrated a special on the infamous
"Alien Autopsy" hoax), the recording claims to have captured
vocalizations among a Bigfoot family. The sounds are a series
of guttural grunts, howls, and growls.
The Web site and liner notes offer testimonials by "expert"
Credit: Cliff Crook/Fortean Picture Library
Nancy Logan. Logan, their "linguist," apparently has little or no
actual training (or degree) in linguistics. Her self-described cre-
dentials include playing the flute, speaking several languages,
and having "a Russian friend [who] thinks I'm Russian." Logan

confidently asserts that the tapes are not faked, and that the vocal range is too broad to be made by a human. She suggests that the Bigfoot language shows signs of complexity, possibly including profanities: "On one spot of the tape, an airplane goes by and they seem to get very excited and not very happy about it. Maybe those are Sasquatch swear words."

Here's what Krantz writes about Bigfoot recordings:

"One... tape was analyzed by some university sound specialists who determined that a human voice could not have made 'them; they required a much longer vocal tract. A sasquatch investigator later asked one of these experts if a human could imitate the sound characteristics by simply cupping his hands. around his mouth. The answer was yes" (Krantz 1992, 134).

As for other such recordings, Krantz has "listened to at least ten such
tapes and find[s] no compelling reason to believe that
any of them are what the recorders claimed them to be" (133).

4. Somatic Samples

Hair and blood samples have been recovered from alleged Bigfoot encounters. As with all the other evidence, the results are remarkable for their inconclusiveness. When a definite conclusion has been reached, the samples have invariably turned out to have prosaic sources- "Bigfoot hair" turns out to be elk, bear, or cow hair, for example, or suspected "Bigfoot blood" is revealed to be transmission fluid. Even advances in genetic technology have proven fruitless. Contrary to popular belief, DNA cannot be derived from hair samples alone; the root (or some blood) must be available.

In his book Big Footprints, Grover Krantz (1992) discusses evidence for Bigfoot other than footprints, including hair, feces, skin scrapings, and blood: "The usual fate of these items is that they either receive no scientific study, or else the documentation of that study is either lost or unobtainable. In most cases where competent analyses have been made, the material turned out to be bogus or else no determination could be made" (125). He continues, "A large amount of what looks like hair has been recovered from several places in the Blue Mountains since 1987. Samples of this were examined by many supposed experts ranging from the FBI to barbers. Most of these called it human, the Redkin Company found significant differences from human hair, but the Japan Hair Medical Science Lab declared it a synthetic fiber. A scientist at [Washington State] University first called it synthetic, then looked more closely and decided it was real hair of an unknown type. . . . Final confirmation came when E.B. Winn, a pharmaceutical businessman from Switzerland, had a sample tested in Europe. The fiber was positively identified as artificial and its exact composition was determined: it is a product known commercially as Dynel, which is often used as

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imitation hair." In his analysis, Winn (1991) noted that another alleged Bigfoot sign found at the site, tree splintering, had also been faked.

Hoaxes, the Gold Standard, and the Problem of Experts

Such hoaxes have permanently and irreparably contaminated Bigfoot research. Skeptics have long pointed this out, and many Bigfoot researchers freely admit that their field is rife with fraud. This highlights a basic problem underlying all Bigfoot research: the lack of a standard measure. For example, we know what a bear track looks like; if we find a track that we suspect was left by a bear, we can compare it to one we know was left by a bear. But there are no undisputed Bigfoot specimens by which to compare new evidence. New Bigfoot tracks that don't look like older samples are generally not taken as proof that one (or both) sets are fakes, but instead that the new tracks are simply from a different Bigfoot, or from a different species or family. This unscientific lack of falsifiability plagues other areas of Bigfoot research as well.

Bigfoot print hoaxing is a time-honored cottage industry. Dozens of people have admitted making Bigfoot prints. One man, Rant Mullens, revealed in 1982 that he and friends had carved giant Bigfoot tracks and used them to fake footprints as far back as 1930 (Dennett 1996). In modern times it is easier to get Bigfoot tracks. With the advent of the World Wide Web and online auctions, anyone in the world can buy a cast of an alleged Bigfoot print and presumably make tracks that would very closely match tracks accepted by some as authentic. What we have, then, are new tracks, hairs, and other evidence being compared to known hoaxed tracks, hairs, etc. as well as possibly hoaxed tracks, hairs, etc. With sparse hard evidence to go on and no good standard by which to judge new evidence, it is little wonder that the field is in disarray and has trouble proving its theories. In one case, Krantz claimed as one of the gold standards of Bigfoot tracks a print that "passed all my criteria, published and private, that distinguishes sasquatch tracks from human tracks and from fakes" (Krantz 1992). He further agreed that it had all the signs of a living foot, and that no human foot could have made the imprint. Michael R. Dennett, investigating for the SKEPTICAL INQUIRER, tracked down the anonymous construction worker who supplied the Bigfoot print. The man admitted faking the tracks himself to see if Krantz could really detect a fake (Dennett 1994).

Krantz certainly isn't alone in his mistaken identifications. One of the biggest names in cryptozoology, Ivan Sanderson, was badly fooled by tracks he confidently proclaimed would be impossible to fake. In 1948 (and for a decade afterward), giant three-toed footprints were found along the beach in Clearwater, Florida. Sanderson, described as a man who "was extremely knowledgeable on many subjects, and had done more fieldwork than most zoologists do today" (Greenwell 1988), spent two weeks at the site of the tracks investigating, analyzing the tracks, and consulting other experts. He con-

cluded that the tracks were made by a fifteen-foot-tall penguin. In 1988, prankster Tony Signorini admitted he and a friend had made the tracks with a pair of cast iron feet attached to high-top black sneakers. J. Richard Greenwell, discussing the case in The ISC Newsletter (Winter 1988), summed the case up this way: "The lesson to be learned within cryptozoology is, of course, fundamental. Despite careful, detailed analyses by zoologists and engineers, which provided detailed and sophisticated mechanical and anatomical conclusions supporting the hypothesis of a real animal, we now see that, not only was the entire episode a hoax, but that it was perpetrated by relatively amateur, good-natured pranksters, not knowledgeable experts attempting, through their expertise, to fool zoological authorities."

The experts, however are only partly to blame for their repeated and premature proclamations of the authenticity of Bigfoot evidence. After all, other areas of science are not fraught with such deception and hoaxing; in physics and biology, light waves and protozoa aren't trying to trick their observers.

Even when there is no intentional hoaxing, "experts" have been fooled. In March 1986, Anthony Wooldridge, an experienced hiker in the Himalayas, saw what he thought was a Yeti (Himalayan Bigfoot) standing in the snow near a ridge about 500 feet away. He described the figure as having a head that was "large and squarish," and the body "seemed to be covered with dark hair." It didn't move or make noise, but Wooldridge saw odd tracks in the snow that seemed to lead toward the figure. He took two photos of the creature, which were later analyzed and shown to be genuine and undoctored. Many in the Bigfoot community seized upon the Wooldridge photos as clear evidence of a Yeti, including John Napier. Many suggested that because of his hiking experience it was unlikely Wooldridge made a mistake. The next year researchers returned to the spot and found that Wooldridge had simply seen a rock outcropping that looked vertical from his position. Wooldridge admitted his misidentification (Wooldridge 1987).

Smoke and Fire

Bigfoot researchers readily admit that many sightings are misidentifications of normal animals, while others are downright hoaxes. Diane Stocking, a curator for the BFRO, concedes that about 70 percent of sightings turn out to be hoaxes or mistakes (Jasper 2000); Loren Coleman puts the figure even higher, at at least 80 percent (Klosterman 1999). The remaining sightings, that small portion of reports that can't be explained away, intrigue researchers and keep the pursuit active. The issue is then essentially turned into the claim that "Where there's smoke there's fire.'

But is that really true? Does the dictum genuinely hold that, given the mountains of claims and evidence, there must be some validity to the claims? I propose not; the evidence suggests that there

are enough sources of error (bad data, flawed methodological

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assumptions, mistaken identifications, poor memory recall, hoaxing, etc.) that there does not have to be (nor is likely to be) a hidden creature lurking amid the unsubstantiated cases.

The claim also has several inherent assumptions, including the notion that the unsolved claims (or sightings) are qualitatively different from the solved ones. But paranormal research and cryptozoology are littered with cases that were deemed irrefutable evidence of the paranormal, only to fall apart upon further investigation or hoaxer confessions. There will always be cases in which there simply is not enough evidence to prove something one way or the other. To use an analogy borrowed from investigator Joe Nickell, just because a small
of
percentage
homicides remain unsolved doesn't mean that we invoke a "homicide gremlin"-appearing out of thin air to take victims' lives to explain the unsolved crimes. It is not that such cases are unexplainable using known science, just that not enough (naturalistic) information is available to make a final determination.
in
A lack of information (or negative evidence) cannot be used as positive evidence for a claim. To do so is to engage the logical fallacy of arguing from ignorance: We don't know what left the tracks or what the witnesses saw, therefore it must have been Bigfoot. Many Bigfoot sightings report "something big, dark, and hairy." But Bigfoot is not the only (alleged) creature that matches that vague description.

The Future for Bigfoot

Ultimately, the biggest problem with the argument for the existence of Bigfoot is that no bones or bodies have been discovered. This is really the 800-pound Bigfoot on the researchers' backs, and no matter how they explain away the lack of other types of evidence, the simple fact remains that, unlike nearly every other serious "scientific" pursuit, they can't point to a live or dead sample of what they're studying. If the Bigfoot creatures across the United States are really out there, then each passing day should be one day closer to their discovery. The story we're being asked to believe is that thousands of giant, hairy, mysterious creatures are constantly eluding capture and discovery and have for a century or more. At some point, a Bigfoot's luck must run out: one out of the thousands must wander onto a freeway and get killed by a car, or get shot by a hunter, or die of natural causes and be discovered by a hiker. Each passing week and month and year and decade that go by without definite proof of the existence of Bigfoot make its existence less and less likely.

On the other hand, if Bigfoot is instead a self-perpetuating phenomenon with no genuine creature at its core, the stories,

sightings, and legends will likely continue unabated for centuries. In this case the believers will have all the evidence they need to keep searching-some of it provided by hoaxers, others perhaps by honest mistakes, all liberally basted with wishful thinking. Either way it's a fascinating topic. If Bigfoot exist, then the mystery will be solved; if they don't exist, the mystery will endure. So far it has endured for at least half a century.

Note

1. The way in which the track was discovered raises questions as well. The expedition log gives an account of how "[Team member Richard] Noll notices an unusual impression in the transition mud at the edge of the wallow and suddenly figures out what caused it. [Team members] Fish and Randles note the shock on Noll's face and come over to have another look at what he's examining. The three observe and note the various parts of the impression, and the chunks of chewed apple core nearby. The base camp is alerted. Everyone comes to see the impression. All conclude the animal was laying on its side at the edge of the mud, reaching out over the soft mud to grab the fruit" (BFRO 2000). So what you have is a case where a group of people are looking for evidence of a Bigfoot. One observer believes he sees a pattern fitting what he's looking for in ambiguous stimuli (shapes in mud). Once the pattern is pointed out to others, they also agree that the pattern could match up to parts of a hominid form in a particular contortion. The rest of the group, who might never have decided on their own that the pattern fits a Bigfoot, then validate the initial observer's (possibly unwarranted) conclusion. This happens all the time, for example when a person recognizes a face or an image in clouds or stains or tortillas. As psychologists know, observers' expectations frequently color their interpretations.

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Cripplefoot Hobbled

Evidence for Bigfoot gains credibility when the possibility of human fabrication can be ruled out. The trackways of a crippled Sasquatch are said to provide such a compelling case, but examination of this claim suggests that hoaxing the footprints may have been a fairly manageable endeavor.

DAVID J. DAEGLING

hat distinguishes Bigfoot from other alleged contemporary monsters is its propensity to leave physical traces of its activity in the form of footprints. Indeed, the compendium of physical evidence attributed to the beast maintains the legend and has prompted some academics to argue for the animal's authenticity.

Arguably the most important Bigfoot trackways were discovered in Bossburg, Washington, late in 1969. Well over 1,000 footprints were left of an allegedly crippled Sasquatch, whose left footprints were "normal" by Bigfoot standards but displayed right footprints betraying a type of acquired or congenital clubfoot deformity (figure 1).

These tracks have convinced several anthropologists that

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the Bigfoot phenomenon is attributable to an unidentified primate living in the forests of the Pacific Northwest. John Napier, a world-renowned expert on the evo-

lution of human locomotion, admitted that he could not conceive that the Bossburg tracks were fabricated.' Similarly, Grover Krantz has related how the morphology of the Bossburg tracks convinced him of the reality of Sasquatch. More recently, an associate professor of biological sciences at Idaho State University, Jeff Meldrum, identified the deformity as an example of metatarsus adductus, and includes the tracks among his examples of alleged Bigfoot prints.[3]

a hoaxer would have been required to fabricate the details of the Bossburg prints from scratch, yet there is an alternative and far more plausible means of hoaxing such details. This alternative is based on the distinction between invention and imitation.

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The possibility neglected by all investigators is that the Bossburg "cripplefoot" is simply an enlarged of a human clubfoot deformity.

In 1969, textbooks describing congenital foot deformities were commonplace and had been for decades, and images (both photographic and radiographic) had been widely available in such sources. The act of copying such images is a far more likely source of hoaxing than the involved cerebral and technical exercise of fabrication based on anatomical principles. It requires no specialized knowledge beyond tracing and enlarging a two-dimensional image, and the fabricated print of a real deformity ensures the correctness of anatomical detail. Krantz's insistence that a hoaxer must match his training and genius is thus irrelevant.

Figure 1. A partially corrected clubfoot in a ten-year-old child and the cast of the Bossburg print (right) showing an uncorrected deformity. The Bossburg track is regarded as some of the best evidence for Bigfoot, as proponents of the track's authenticity argue that the prints were unlikely to have been fabricated. Although the details of the child's foot and the Sasquatch print differ, the general proportions of the feet are comparable. From Fripp and Shaw (1967, left) and Dennett (1994, right).

The rationale for accepting the tracks as genuine is summarized by Krantz in his book Big Footprints: “I figured the whole thing out after

studying the footprints; any hoaxer had to plan it all out from nothing. This requires an expert anatomist with a very inventive mind, more so than me, and I seriously doubt that any such person exists" (1992, 63).

Krantz's opinion, consistent with Napier's and Meldrum's reasoning, is that the preserved imprint of the deformed foot is imbued with so much anatomical detail that the average person would not have the expertise required to fabricate the print. Critical to the argument is the suggestion that the proportions of the foot, in terms of the relative lengths of individual bones reconstructed from the deformed foot imprints, are decidedly nonhuman. Both Krantz and Meldrum agree that the bony proportions implied by the Bossburg tracks are biomechanically consistent with a large body mass significantly beyond human range. A potential hoaxer, it is argued, would be unlikely to understand the subtle functional transformations that would be entailed in scaling up a human foot to a biped of the staggering size of Bigfoot.

Invention or Imitation?

There is, however, a significant oversight in this argument. The linchpin of the argument is that

Figure 2. Dorsal (top) view of a normal human foot skeleton. Arrows point to the displaced anatomical joints allegedly responsible for the "bunions" on the pathological Bossburg track. X marks the location of the tibiotalar joint, the position of which was inferred, in part, from the location of these bunions. The tibiotalar joint is claimed to be shifted relatively forward in the Sasquatch foot, even though this joint makes no direct contact with the substrate during walking. Foot skeleton from Kriz (1998).

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The argument for authenticity also hinges on the assumption that the footprints show a foot skeleton unique in proportion relative to human feet. If this observation is true, the hypothesis of an imitative hoax is undermined. This claim, however, rests on the assumption that Krantz's skeletal reconstruction of the Bossburg tracks is correct. Several arguments'

throw into question the accuracy of Krantz's reconstruction. First, the centerpiece of the reconstruction, in terms of establishing a foot that is functionally distinct from the human condition, depends on the correct placement of the tibiotalar joint of the ankle (Dennett 1994), an articulation that is well removed from the plantar surface (sole) of the foot (figure 2).
A second problem is whether the pedal skeleton can be accurately reconstructed from the surface features of the sole of the foot-specifically the location of anatomical joints so crucial to Krantz's argument. The Bossburg track is said to permit this because of the presence of two pathological "bunions" on its lateral (outer) border. These bunions are claimed to correspond to the calcaneocuboid and cubometatarsal joints of the foot, but this

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assertion lacks supporting clinical evidence or other empirical foundation. It is equally plausible to assign these to unusual prominences of other bones in the region (the cuboid and fifth metatarsal bones or the inconstant sesamoid bones os peroneum and os vesalianum) or any number of soft tissue pathologies. In any case, between the ball of the foot and the heel there are few landmarks to guide an anatomist to a perfect reconstruction (figure 3).
A third argument, however, may render the preceding objections immaterial. The assumption made to this point is that footprints are accurate reflections of plantar morphology. A recent study by Gatesy et al. (1999) found that track variation among terrestrial birds and dinosaurs is more a function of the substrate (i.e., soil and terrain) than of foot morphology. Thus, in the dynamic context of locomotion, it cannot be assumed that an imprint of a foot bears a perfect image of that foot's structure. Only one set of print casts survives from Bossburg (Dennett 1994), so the variation in the hundreds of tracks left at the scene is unknown.
E
Fahrenbach's (1998) conclusion that

Sasquatch feet are not proportionally enlarged human feet? Krantz's assessment of the footprint evidence has led him to conclude that Sasquatch prints are "disproportionately wide" (1992, 52). If the Bossburg tracks exhibit this trait, it would seem that copying and enlarging human prints could be ruled out. But there is a human source for fabrication after all. Human feet change subtly but unmistakably in their shape during development (Scheuer and Black 2000). Infant feet, a typical subject of photographs documenting foot deformities, display relatively wide feet in their outward appearance despite maintaining proportions of bony segments that are similar to those of adults (Hoerr et al. 1962). The outward appearance of infant and young juvenile feet is similar to the shape of the Bossburg tracks (figure 4). A would-be hoaxer, by selecting and enlarging an image of a young person's foot deformity, would produce a Sasquatch track that-intentionally or not corresponded to shapes seen in the inventory of Bigfoot tracks that existed prior to 1969. One cannot legitimately argue that the correspondence between a hoaxed print and Bigfoot's theoretical ideal beyond probable: The skeletal reconstruction was based on the footprints themselves and not independently derived.

Figure 3. Footprints of an individual compared to radiographs of their respective foot skeletons. The near identity of the right and left footprints belies the marked differences in skeletal anatomy discerned in the radiograph. This observation reinforces the argument raised by Dennett (1994), chat skeletal reconstructions from footprints are prone to error. From Tachdjian (1990).

If one concedes that the tracks preserve the true foot proportions of the hobbled biped (an unanswerable question thirty years after the fact), the uniqueness of the foot that made them can be assessed. If Krantz's claims are taken at face value: 1) that the foot skeleton can be inferred from a footprint and 2) that the reconstructed foot skeleton differs significantly from a human's, then it follows that the morphology of the tracks must also be decidedly nonhuman in their proportions. In examining the normal footprint of the Bossburg Sasquatch, Napier (1972) provides a figure in which a scaled-up human foot is superimposed on the "normal" Bossburg track. The outlines described by the two are very similar-sufficiently comparable in fact that Napier himself described the Bigfoot's print as human in outline. If this track is, in fact, nothing more than a

gigantic human form, it becomes more mysterious how one concludes from it that Sasquatch feet are biomechanically distinct from those of their puny human cousins. The rejoinder that the reconstruction was derived from the deformed track is vacuous, since then we have to entertain the tortuous argument that somehow the crippled print betrays a once functionally harmonious skeleton while the normal print must be (by virtue of its human form) ill-proportioned for the task of propelling its massive owner.

But what if Napier is simply wrong, and instead we embrace Napier's difficulty in conceiving of the Bossburg tracks as human fabrications was focused on the underlying motivation of a would-be hoaxer, because he could not imagine why someone would go to the trouble. In the years since the crippled Sasquatch supposedly hobbled through Bossburg, however, many of the details of the entire episode have been forgotten or neglected (Dennett 1994). Ivan Marx, a longtime Bigfoot hunter, was living in Bossburg at the time the tracks began to appear and eventually shot a film of the crippled Sasquatch. It is universally regarded as a hoax even among the staunchest Bigfoot advocates, though no one has specifically settled on who should receive proper credit for the fraud." The allegation of Hunter and Dahinden (1973, 170) that Marx was seen purchasing a number of furs in Spokane before the film was made was also not encouraging to the core of potential believers. Adding to the intrigue were claims by other parties of a Sasquatch foot stashed in a Portland freezer and a still-breathing Bigfoot being trapped in an undisclosed mineshaft (Hunter and Dahinden 1973). Neither bodies nor parts thereof ever materialized, but tens of thousands of dollars were offered

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with respect to these items and the film. Smaller amounts of currency actually did change hands in the course of attempts to maintain or secure access to the alleged bits of evidence. The presence of cash transactions in Bossburg provides the motivation for potential hoaxers that Napier could not fathom.

Conclusion

In their discussions of the Bossburg evidence, the three anthropologists apparently do not believe the film or other activities are germane to the issue of authenticity, since they only mention Marx's presence at the scene but not his subsequent cinematic exploits. Similarly, talk of mineshafts or freezer burn is also absent. It is

arguable whether full disclosure is called for-after all, if the footprints are genuine, then the collateral activities are irrelevant. The argument for authenticity, however, is based primarily on the assumption that a hoax is implausible on the merits of the tracks alone. Once an alternative scenario for hoaxing the prints in a presentation at the 1999 meetings of the American Association of Physical Anthropologists. Meldrum's diagnosis was reported by Grover Krantz (1999). In print, Meldrum has neither endorsed the authenticity of the tracks nor suggested that they are fabricated, but considers the tracks consistent with his model of the anatomy and function of Sasquatch feet.

primary

4. A PubMed search of the literature revealed 229 published articles on clubfoot deformities from 1900 to 1969, which can be safely considered a conservative estimate of the number of papers dealing with the phenomenon. The number of articles with images or figures is not known. Textbooks having figures and radiographs of clubfoot deformities were also readily available in 1969. An exact count is difficult to come by, but publications dealing with foot pathologies began to appear with some regularity in the mid-nineteenth century, so the question of access to such material is not an issue.

5. The "unique" form of Sasquatch tracks is an oft-proposed argument for their authenticity. Fahrenbach (1998) offers a statistical analysis that suggests nonhuman foot proportions for the legendary Sasquatch.

6. Marx is a prolific photographer of Bigfoot, having filmed the beast on at least five occasions. Some of his more inspired work can be found on his video production The Legend of Bigfoot (1982, Palladium Pictures). John Green's Sasquatch: The Apes Among Us (1978) and Don Hunter's and Rene Dahinden's Sasquatch/Bigfoot (1973) offer independent accounts of what is known as the "Bossburg Incident." Peter Byrne is credited with uncovering several inconsistencies between the film itself and the narrative surrounding it.

Figure 4. The foot of a ten-year-old compared to the "normal" Bossburg track,

not to scale. Enlargement of the juvenile foot results in a shape remarkably reminiscent of these Bigfoot tracks. The argument that the Bossburg tracks could not have been faked entails the questionable assumption that a hoaxer could not have fabricated a scaled-up model of a child's footprints. Left image from Fripp and Shaw (1967), right image is from a photo in Rene Dahinden's collection.

is identified, the issue of motivation appropriately comes to the fore.

Like the Patterson-Gimlin film, the Bossburg tracks occupy a central position in Bigfoot lore, their authenticity tied to the assumption of the impossibility of their fabrication. In the case of both pieces of evidence, the mere assertion that hoaxing can be ruled out is taken to be equivalent to a demonstration that this has, in fact, been established. For example, David Gordon (1992) argues for the authenticity of the Bossburg tracks by reasoning that it is "absurd" to suggest that anyone would think to fabricate deformed Sasquatch feet with anatomical accuracy. It is essentially the argument made by Krantz and Napier, in substance what Richard Dawkins (1986, 38) derides as the "argument from personal incredulity." When supporting arguments take this form, the search for Bigfoot becomes not so much a scientific enterprise but a subjective matter of personal conviction.

Notes

1. Napier's final verdict was this: "It is very difficult to conceive of a hoaxer so subtle, so knowledgeable-and so sick-who would deliberately fake a footprint of this nature. I suppose it is possible, but it is so unlikely that I am prepared to discount it" (1972, 122).
2. Big Footprints, pp. 43, 53. Boulder, Colorado: Johnson Books.
3. Meldrum (1999) offered a biomechanical and anatomical analysis of

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EDITOR'S NOTE

Monsters, Mind, and Memory

och Ness has no lock on stories of fabled underwater monsters. North Lamerica has its lock, with "Champ," the alleged creature of Lake

Champlain. In this issue we publish two reports of the SKEPTICAL INQUIRER'S own investigative "Champ" Expedition, carried out last summer. Senior Research Fellow Joe Nickell and SI Managing Editor Benjamin Radford examined all aspects of the Champ legend. They explored the lake and its shores from tip to tip, studied all the major articles and books, talked to local residents, and interviewed witnesses of alleged sightings. As Joe says in his Investigative Files report, "We believe ours was the most wide-ranging, hands-on investigation of Champ ever conducted with an intent to solve, rather than promote, the mystery."

Ben investigated the most famous photograph of a supposed monster in Lake Champlain, the 1977 Sandra Mansi photo in what is considered the most complete and fully documented sighting of any lake monster in history. He and Joe talked with Mansi, and after an exhaustive and detailed review of both her account and the photograph decided she is probably a sincere eyewitness. Nevertheless, Ben's own in-water measurements and his analysis of the photo, based on Mansi's own estimates and testimony, reveal such severe inconsistencies with previous interpretations that this "best evidence" dissolves. Details are in his article "The Measure of a Monster."

Three important articles related to the mind, mental perceptions, and misuses and abuses of psychological tests and memory-recovery techniques follow. The authors are all prominent psychological scientists.

The Rorschach inkblot test is embedded in popular lore. Many clinical psychologists have clung to the test while research psychologists have been telling them it's just a bunch of ink (bunk). In "The Rorschach Inkblot Test, Fortune Tellers, and Cold Reading," James Wood, Teresa Nezworski, Scott Lilienfeld, and Howard Garb explore the technique's powerful mystique and show why it has more in common with the psychology of astrology and palm reading than anything remotely valid.

Alan Bensley examines from a cognitive science perspective the dualistic belief that the mind is somehow something separate from the body. This dualism leads to deeply entrenched religious beliefs such as the soul and its independence from our material body and related paranormal concepts such as ghosts, astral projection, reincarnation, and the paranormal interpretation of the out-of-body experience. Cognitive science has deep insights into why our minds work that way and validates that conscious experience as a consequence of the function of brain and nervous system.

Steven Jay Lynn, Elizabeth Loftus, Scott Lilienfeld, and Timothy Lock review the problems and pitfalls of memory recovery techniques in psychotherapy. They examine a number of widely used but questionable memory recovery procedures-guided imagery, suggesting false memories, hypnosis, searching for early memories, age-regression, hypnotic age-regression, past-lafe regression, symptom interpretation, bogus personality interpretation, dream interpretation, and "bibliotherapy." The common thread of these procedures? Their ability to distort memory or create false memories.

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INVESTIGATIVE FILES

JOE NICKELL

Legend of the Lake Champlain Monster

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Nermed "North America's Loch Ness Monster" and known affectionately as "Champ," the legendary Lake Champlain Monster reportedly haunts the waters of its namesake. Lake Champlain began roughly 10,000 years ago when an estuary of the Atlantic Ocean, the Champlain Sea, was transformed by receding glaciers into an inland, freshwater body (Zarzynski 1984). This lake and some say the creature too was "discovered" in 1609 by Samuel de Champlain. Since then, the 125-mile-long lake, situated between New York and Vermont (with six miles extending into Québec), has received much attention. In 1873 and 1887, showman P. T. Barnum offered huge rewards for the monster-dead or alive (Zarzynski 1984, 83). More recently, there has been much "cryptozoological" interest and the development of a burgeoning Champ industry. Proliferating sightings, "theories" of self-styled monster hunters, and even a Holy-Grail photo of the supposed beast have spawned innumerable newspaper and magazine articles, books,

entries in paranormal compendia, and radio and television segments, not to mention keychains, mugs, T-shirts, and Joe Nickell is CSICOP's Senior Research Fellow and author of numerous investigative books.
other offspring, including "Champburgers" (seafood patties on sesame-seed buns). Such endeavors have made
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missiquoi Bay
Maquam Bay
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.Burlington
Fort Cassin(site)
Button Bay State Park
VERMONT
while extinct creature. Champ seeker Joseph Zarzynski has even given it a name: Beluaaquatica champlainiensis ("huge water creature of Lake Champlain") (Owen 1982).
To assess the reputed phenomenon, SKEPTICAL INQUIRER managing editor Ben Radford and I launched "The 'Champ' Expedition" in the summer of 2002. We examined all aspects of the Champ legend, from its alleged inception, through the impact of a famous 1977 photograph of the creature, and beyond. Unlike some so-called investigations-which, while long-running, were largely attempts to collect sighting reports-we believe ours was the most wide-ranging, hands-on investigation of Champ ever conducted with an intent to solve, rather than promote, the mystery.
Lake
Champlain Champ Expedition
NICKELL
Figure 1. Map of Lake Champlain, showing selected sites.
Champ the best-known lake monster in the United States and, except for British Columbia's "Ogopogo," in all of North America. "Few cryptozoologists deny the

possibility of Champ's existence," states W. Haden Blackman in his The Field Guide to North American Monsters (1998), "and many openly accept the creature," believing it to be a plesiosaur, zeuglodon, or other unknown or erst-
Our investigation was multi-faceted. I made an advance trip (August 2-4, 2002) to take in the annual Champ Day celebration (August 3) in Port Henry, New York, interview various people, buy books, and, in general, scout resources and make plans for our subsequent two-man expedition, August 22-26.
In the interim we began to study the myriad articles and books on Champ and other alleged lake monsters. Ben did extensive work to ready experiments regarding the famous 1977 Champ photo by Sandra Mansi, while I located

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her by phone, arranged for an interview, and (from photo expert Rob McElroy) borrowed a vintage camera like the one Mansi had used. We discussed options, drafted itineraries, obtained and readied gear, and made other preparations.
With my car fully loaded, we set out for Whitehall, New York. There we met friend and fellow skeptic Robert Bartholomew and his brother Paul (who is a cryptozoologist), and discussed many relevant issues with them. Then we began to explore Lake Champlain from its southernmost tip near Whitehall to its northern end in Québec (see map, figure 1). Our "base camp" for the next two days was Collins Cabins at Port Henry. Late the first afternoon we set up "Champ Camp I" at a boating ramp area just outside Bulwagga Bay (figure 2), the locale of a majority of Champ reports, and maintained a watch from 7 to 8:30 P.M.-a supposedly prime time for Champ sightings (Kojo 1991). Unfortunately Champ was a no-show.
We later conducted research at the Collins Cabins' bar-seriously! With Ben taking notes, I inquired of a group of men about a local signboard that lists

Bulwagga Bay "Champ Sightings," six columns of names and dates (see figure 3). One man, William "Pete" Tromblee, quipped that it was "a list of the local drinkers." In fact Tromblee's own 1981 sighting is listed, although he assured us he was entirely sober at the time. He did admit that he did not know what he saw and volunteered that it might have been a large sturgeon-a refrain one hears quite often. The proprietor, Mrs. Rita Collins, rummaged through a drawer behind the bar and came up with some related newspaper clippings, including one with a photo of a "six-foot piece of driftwood that bears a striking resemblance to artists' conceptions of Lake Champlain's legendary monster, Champ."

The following day (August 24) we crossed the Champlain Bridge to Vermont. We explored the lake shore around Otter Creek, dropped in on the naturalist at Button Bay State Park, and then proceeded to Bristol to keep our appointment with Sandra Mansi regarding her famous snapshot of-well, that

Figure 2. Benjamin Radford maintaining a Champ vigil.

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Figure 3. Champ monster sighting board at Port Henry, New York, the "Home of Champ."

is the question Ben addresses in his article elsewhere in this issue.

sheephead. However, on our entire tour of Bulwagga Bay and many miles beyond, we saw nothing, either visually or on sonar, that could be construed as the "monster" in figure 5). That is not surprising, given that during more than four decades on the water he has never seen a giant unknown lake creature. He says he has occasionally encountered a wave on calm water that puzzled him, and, like others, will say there's "some-thing" out there. But he is more likely to suggest a sturgeon than a plesiosaur.

We subsequently rendezvoused with Norm St. Pierre, a veteran fisherman and lake guide who operates Norm's Champ Bait and Tackle at Crown Point, New York (a few miles south of Port Henry). Outside this "One Stop Hunting and Fishing Supply Store" rests a giant hook, baited with a large rubber fish and wagishly labeled "Norm's Champ Rig Norm was to be our guide, aboard his sonar-equipped Starcraft cruiser, to a major area of Champ's reputed lair. (More on all these matters presently.)

The sonar (figure 4), which Norm uses to locate schools of fish, soon picked up a 12- to 20-pound catfish or
Early in the morning we closed out our base at Port Henry and, again crossing

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Figure 4 Norm St. Pierre, veteran fishing guide, aboard his sonar-equipped boat.

into Vermont, made our way to St. Albans and beyond. We searched the areas of Maquam and Missiquoi Bays (again see map) in hopes of finding a landscape that could match the location of the Mansi sighting. Unfortunately her description of the location was so vague as to be almost useless, and the intervening years had perhaps changed the scene completely. This precluded one set of photographic experiments but we located a suitable area for others, near a boat launch. By wading into the water Ben discovered that it was surprisingly shallow for more than 150 feet offshore. This was fortuitous since we could avoid having to use our raft, but it raised an interesting point. A local man who had resided there for thirty years said that the general shallowness of the lake in the surrounding area made him doubt the presence of any leviathan there. Indeed, while the lake reaches depths of up to 400 feet, the maximum for all of Missiquoi Bay is fourteen feet. And for the eastern edge of Maquam Bay and the connecting area of lake, the offshore depth at Mansi's estimated sighting distance of 150 feet is twelve feet or less, as shown by a Lake Champlain hydrographic contour map (Lake n.d.).

The experimental work was time-consuming, but we were through by mid afternoon and continued north to the upper end of Lake Champlain at Venise Bay, Québec. We stopped along
NOR
the way to explore and to photograph some driftwood that had piled up along the shore. We returned as far south as Burlington, Vermont, that night. Ben was glad to finally be able to wash up from his swim in Lake Champlain and to treat a cut foot-injured on sharp

rocks during the earlier experiments. Our final day, the 26th, was another long one. We took the ferry Valcour from Burlington to Port Kent, New York, traversing Lake Champlain at one of its widest places. We maintained a Champ watch, noting that some reported sightings had been made from ferries as well as other boats. A veteran deckhand told us he teased children to look overboard for Champ and instructed adults to "go below" to the on-board snack bar that serves beer and wine so they might also be able to see the creature.

Disembarking from the Valcour, we headed south along the west coast of Lake Champlain until we veered away on the interstate and headed for home. We had traveled over twelve hundred miles, and had obtained quantities of notes, photographs, videotapes. books, charts, and other research materials-all of which would now need careful study. Here are our findings.

Sightings

Promoters of Champ's existence cite a major eyewitness. According to Discover magazine (Teresi 1998). "The first recorded sighting of Champ dates back to July 1609, when Samuel de Champlain claimed he saw a '20-foot serpent thick as a barrel, and a head like a horse." This quotation from Champlain-which has been repeated, paraphrased, and embellished with Indian legends (e.g., Coleman 1983; Green 1999)-is, alas, bogus. Jerome Clark (who was once taken in by the claim [1983]) reports it "traceable to an article by the late Marjorie L. Porter in the Summer 1970 issue of Vermont Life (Clark 1993).

Champlain's actual description is in volume 2, chapter IX, of his journal (quoted in Meurger 1988).

[T]here is also a great abundance of many species of fish. Amongst others there is one called by the natives Chaousaron, which is of various lengths; but the largest of them, as these tribes have told me. are from eight to ten feet long. I have seen some five feet long, which were

as big as my thigh, and had a head as large as my two fists, with a snout two feet and a half long, and a double row of very sharp, dangerous teeth. Its body has a good deal the shape of the pike; but it is protected by scales of a silvery gray colour and so strong that a dagger could not pierce them.

As Champlain's actual account demonstrates, far from heralding a serpentine, horse-headed monster, he simply mentions a native species of large fish. It was almost certainly a gar (or garfish), one of the Ganoidei subclass (from the Greek ganos, "shiny"), which includes sturgeons and other varieties.

Supposed other evidence of an early Champ sighting comes from an old powderhorn bearing a Crown Point soldier's name, the year 1760 and various pictorial elements, including "a rather large dragon-like creature." Zarzynski (1984, 52-53) suspects this is a "possible link" to Champ. However, the figure is merely a stereotypical dragon-complete with large wings. It is by no means evidence for the existence of a Lake Champlain leviathan.

In his Champ: Beyond the Legend, Zarzynski (1984, 152-205) catalogued 224 "Champ" reports. Putting aside Samuel de

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Champlain's, which never occurred, the rest are from the nineteenth and twentieth centuries. The earliest is from 1819 and is still the most sensational description of Champ ever recorded. I tracked down the original account in the Plattsburgh Republican of Saturday, July 24.

The sighting was attributed to a "Capt. Crum" who was in a scow on Bulwagga Bay the previous Thursday morning. The black monster was said to be about 187 feet long with its flat head-resembling that of a "sea-horse"-rearing more than fifteen feet out of the water. The creature was some two hundred yards away (twice the length of a football field) and was traveling "with the

utmost velocity" while being chased by "two large Sturgeon and a Bill-fish." Nevertheless, the captain was able to notice that it had three teeth, large eyes the color of "a pealed [sic] onion," a white star on its forehead, and "a belt of red around the neck." The incident has an outlandishness about it that suggests someone was pulling the reader's leg.

Hoax or not, that monster has not been seen since, or has apparently shrunk to a fraction of its former self and lost its distinctive markings, although not without gaining others. Anyway, according to the various reports Champ is between ten and 187 feet long, has one to four or more humps or up to five arching coils, and is black, or has a dark head and white body, or is gray, or black and gray, or brown, moss green, reddish bronze, or other colors, possibly being drab or shiny, scaly or smooth-even "slimy." Moreover, it possesses fins, or a pair of horns, or "moose-like antlers," or "elephant ears," or a tan or red mane, or glowing eyes, or "jaws like an alligator" or again had none of these. Overall it looked like a great snake, "a large Newfoundland dog," "a steam yacht" (although traveling too fast to be one), a horse, a Florida manatee, a submarine periscope, a whale, etc., etc. (Zarzynski 1984, 152-205).

Astonishingly, some writers have concluded that there is a "surprising degree of correlation between all the various descriptions" (Grant 1992, 115), that they are indeed "disturbingly similar" (Vachon 1977). However, to the rest of us it appears that either Champ is a metamorphosing, contortionistic, chameleonesque creature, completely unknown to the natural world, or else eyewitnesses are viewing and no doubt misperceiving a number of different things.

Many of the sightings were from considerable distances-often a hundred yards or more, a few at between a quarter and three-quarters of a mile, four at one mile, and at least one at two miles away, although often the distance was unreported. (A dozen observations were made by

the use of spyglasses or binoculars.) Since the apparent size of the creature depends on how far away it is, then mistaking either the distance or size will result in misjudging the other accordingly. If we consider other factors-such as surprise, poor visibility on several occasions (such as nighttime sightings and viewing the creature while it was entirely underwater), and other problems, including the power of suggestion-the sightings could obviously be fraught with error.

"Expectant Attention"

One should not underestimate the power of what Rupert T. Gould, in his The Loch Ness Monster and Others (1976, 112-113), called "expectant attention." This is the tendency of people who, expecting to see something, are misled by anything having some resemblance to it. For example, a log may be mistaken for a lake serpent under the right conditions, especially in an area where reports of such a creature are common. Indeed, logs have actually been mistaken for the Loch Ness Monster. Gould (1976, 107) describes two instances of his own knowledge in which "a pair of binoculars resolved an apparent 'monster' into a floating tree-trunk" at the Loch.

Perhaps certain Lake Champlain monster sightings can be so explained. One from circa 1886, for instance, said the monster looked "like a long log or pole," while a 1954 report described the creature as "like a telephone pole in appearance." Photos of "monster"-shaped driftwood at Lake Champlain have been published (Zarzynski 1984, 99, 163, 171; "Champ unmasked" n.d.).

In this regard, local fisherman Tom Forrest told an illuminating story. In 1998 he was with a group of people who saw "Champ," and some were frightened. In time, however, it turned out to be a partially waterlogged tree trunk, bobbing and propelled by the current. It was nearly forty feet long with a root that resembled a monster's head (Forrest 2002).

A particular feature of Lake Champlain-an effect called a seiche-

may help to produce just such sightings. A seiche is a great underwater wave that sloshes back and forth, even though the lake's surface appears smooth. The sloshing may dislodge debris from the bottom-logs or clumps of vegetation, for example-that bob to the surface as "monsters" (Teresi 1998).

Another likely candidate for some Champ sightings is a large fish. Samuel de Champlain's Chaousarou clearly a gar is an obvious possibility. Tom Forrest has caught very large gar. When I spoke with him he had only days before witnessed a friend hook a Longnose Gar that
Forrest insists-was "monster" sized; it measured approximately 6 feet 4 inches long and weighed some 40-50 pounds. He calls this "the real Champ" and has dubbed it, appropriately, "Gargantua" (Forrest 2002).

Among other large fish in the lake are sturgeon which are now endangered. They are generally in the five-to-six-foot range but can grow to twice that size (Zarzynski 1984, 98-100; Meurger 1988, 47-48). In fact, one couple who saw a 6-foot creature in 1949 described it as possibly a large sturgeon. While a sturgeon's length is insufficient to account for some other Champ sightings, the size may easily be overestimated.

Multiple fish can appear as a single monster. On July 7, 1988, Walter and Sandi Tappan saw several creatures and videotaped one "series of small humps" they believe was a large creature. The video was included on a September 23. 1992, episode of NBC's Unsolved Mysteries. Even monster enthusiast John Kirk (1998, 135-136), who acknowledges that the Tappans claimed to see the monster's head and neck, believes the video shows "fish feeding near the surface."

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Figure 5. Monster or rock? You decide! Ronald Binns (1988, 205-207) tells of a young man who spied a 50-foot sea serpent off England's Brighton beach in

1857; in later years, after he became a marine biologist, he realized he had actually seen several dolphins "swimming in line." In this manner, two or more large gar, sturgeon, or other fish could easily appear as a single multi-humped monster. accounting for numerous such sightings at Lake Champlain.

Otters, which are playful and enjoy "chasing each other" and "following the leader" (Godin 1983) are especially prone to creating this illusion and in general being mistaken for lake monsters, as I discovered in investigating other cases. For example, Jon Kopp, a Senior Wildlife Technician with New York's Department of Environmental Conservation, told me of a personal encounter when he was in a duck blind on a lake in Clinton County. It was dark, when suddenly, heading toward him was a huge snakelike creature making a sinuous, undulating movement. However, as it came closer, Kopp realized that the "serpent" was actually six or seven otters, swimming single file and diving and resurfacing to create the serpentine effect. "After seeing this," Kopp told me, "I can understand how people can see a 'sea serpent (Nickell 2001, 102).

Otters have been mistaken for monsters elsewhere, including Loch Arkaig and Loch Ness in Scotland (Binns 1984, 186-191) and, I believe, Lake Utopia in

New Brunswick, Canada, and Silver Lake in Wyoming County, New York (Nickell 2001, 133-135, 92-103), as well as many other lakes. The Northern River Otter (Lutra canadensis) measures up to 52 inches long, and is dark brown with a lighter, grayish throat and belly but "looks black when wet" (Whitaker 1996). While treading water with its hind paws, it can extend its head and long neck out of the water, inviting comparisons with the extinct plesiosaur, which is so often mentioned as a possibility for "Nessie" and "Champ" (Binns 1984, 186–191).

In light of otters, consider this Champ report. On June 15, 1983, several witnesses saw a 30- to 40-foot creature with four humps in Lake Champlain off the site of Fort Cassin. However, as one ad-

mitted to the Lake Champlain Phenomena Investigation (Zarzynski 1983), "It could have been one large creature or four smaller ones"-a concession that takes on new significance when we learn that this site was at the "mouth of the Otter Creek." (Although it is actually Vermont's longest river, it is otherwise aptly named as a habitat for the Northern River Otter.)

A few miles away, Button Bay State Park Naturalist Laura Hollowell showed me a drawing made by a young girl who had seen a "baby Champ." Hollowell (2002) believes this and other such infant-monster sightings may well be otters. She told me she believes "People have seen otters and mink swimming in the lake and think they've seen Champ She said she is "surprised at what unreli able reporters people can be in terms of wildlife sightings," adding, "I dont believe that there are any large, uniden tified animals in Lake Champlain." Keeping in mind eyewitness descrip tions of Champ with horns, "moose-like antlers," or a head "like a horse (Zarzynski 1984, 161, 165, 177), one cannot help but acknowledge other wildlife possibilities. Allowing for overestimation of length-which is especially easy to do if there is a wake-swimming deer come readily to mind. Even some believers among Loch Ness monster hunters considered this the probable explanation for "horned monster" reports in their bailiwick. Indeed, when one photo of Nessie was enlarged, "she" was revealed to be a deer (Binns 45, 191-193).

Still other possibilities for Champ (and many purported lake monsters elsewhere) include wind slicks and boat wakes. A deckhand on the Valcour ferry (out of Burlington, Vermont) told us that Champ reports had declined in the last fifteen years or so with the cessation of large traffic on the lake. A barge's wake often traveled across the lake, he said, mystifying anyone who might encounter it without seeing its cause. Thus some people could infer, or imagine having glimpsed, the fabled lake

creature (Valcour 2002).
In other sightings and photographs, additional culprits-including other swimming animals and marine creatures, long-necked birds, even rocks (see figure 5)-may also pose as a lake monster, along with toy models and manipulated images (Binns 1984; Nickell 1994). Considering all such factors, there seems no compelling reason to postulate the existence of a hitherto unknown creature in Lake Champlain.

Bandwagon Effect

I did an analysis of the 224 sightings listed by Zarzynski (1984, 152-205) (less the nonexistent 1609 sighting and nine completely undated reports). Interestingly, during the entire period before 1860 there was only a single

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recorded sighting which, as I have indicated, was probably a spoof. After that, recorded sightings increased in the 1870s and 1880s (to fifteen and twenty-three respectively), then declined again before shooting up steadily in the 1960s (fifteen), 1970s (fifty-nine), and 1980s (seventy until mid-1984). The reason for the fluctuations is uncertain, but if there were several large leviathans in the lake prior to 1860 as proponents believe, why was there only one highly doubtful sighting? Why did not the Native Americans know about the creatures, and tell Samuel de Champlain about them rather than the comparatively mundane chaousarou (garfish)?
As to the modern rise in sightings (which is obviously much greater than a mere growth in population), that may well be due to heightened expectancy caused by an increase in articles, books, and other media reports on the subject. Loren Coleman (1983, 89) gives some credit to "the arrival on the scene" of Joseph Zarzynski, who gave those who had previously been ridiculed "a sympathetic ear." That seems only fair, but Zarzynski's and others' excessive credulity may have tipped the scales in the opposite direction, resulting in a still

greater expectancy and thus helping to create something of a bandwagon effect. This seems supported by the tendency of the reported imagery to subtly conform to the concept of the day. For example, the term "sea serpent" was used in several nineteenth-century accounts but was effectively dropped afterwards (except for a single journalist's use). The most prevalent descriptor overall was "huge snake" (or similar wording), but in modern times (after 1978) reports occasionally likened the creature to a "dinosaur" (Zarzynsky 1984, 152-205). This probably reflects the popular notion-after the widely circulated 1934 hoaxed photo of the Loch Ness Monster (Nickell 1994, 171; 1996)—that such mythical beasts resemble plesiosaurs. Michel Meurger, in his Lake Monster Traditions: A Cross-Cultural Analysis (1988, 39), concludes that "... Champ's modern fame is the product of local monster-enthusiasts in their efforts to promote their own legend along Lochnessian lines.

Evaluation

Not only is there not a single piece of convincing evidence for Champ's existence, but there are many reasons against it, one of which is that a single monster can neither live for centuries nor reproduce itself. There would need to be several in a breeding herd for the species to have continued to reproduce over time ("Myth" 1972).

Zarzynsky (1998) acknowledges this, theorizing that a colony of thirty or fewer plesiosaurs have inhabited Lake Champlain since its formation some 10,000 years ago. However, with so few individuals he worries that Champ is near extinction. Fellow monster hunter Dennis Jay Hall (2000, 15), on the other hand, insists: "There is a healthy population of these animals living in Lake Champlain. They are here for a reason; this is their chosen home."

But then where is a floating or beached carcass or other certain trace of the fabled creature? Although there are possible reasons why a Champ carcass might be rare (for example, most deaths could occur in winter, when the lake

largely or completely freezes over [Zug 1981]), there is no question about the existence of sturgeon, gar, otters, and other Champ look-alikes. The absence of a Champ carcass "does not support the existence of such creatures either," according to the Smithsonian's Dr. George Zug (1981). And where are the bones that, as Gould (1976, 120) asked of Loch Ness, should have eventually covered the entire lake floor?

The burden of proof, of course, is on the claimants. Far from meeting that burden, however, the Champ defenders are instead promoting a mystery and■ like so many paranormalists—are thereby engaging in a logical fallacy called arguing from ignorance: 'We don't know what these people saw; therefore, it must have been Champ.' One cannot draw a conclusion from a lack of knowledge, and so, until an actual specimen presents itself, the possibility that any large, unknown animal inhabits Lake Champlain remains somewhere between extraordinarily slim and none.

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The Measure of a Monster
Investigating the Champ Photo
The most famous photograph of a monster in Lake Champlain was taken in 1977. The photo sparked the modern age of Champ investigations and renewed national interest

in the creature. Recent field experiments, however, reveal that the "creatures" size is less than monstrous and the main eyewitness is mistaken.

BENJAMIN RADFORD

ake Champlain forms the border between Vermont and New York, stretching down from Canada at its northernmost point south to Whitehall, New York. It is also, many people believe, home to America's version of the Loch Ness monster. "Champ," as the creature is called, has allegedly been seen by hundreds of witnesses. The lake (and therefore the monster) is named for explorer Samuel de Champlain, who is often-but erroneously-said to have been the first to report the creature. Sought after by P.T. Barnum, featured on Unsolved Mysteries, and "officially" protected by both the New York State Assembly and the Vermont Legislature, Champ remains a modern mystery. A big part of that mystery lies not only in the cold waters of

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the lake but also in a small photograph taken by a woman named Sandra Mansi. Mansi's account of her family's 1977 encounter with Champ is the most complete and fully documented of any lake monster sighting in history. With the most famous photo of the Loch Ness monster (the "surgeon's photo") revealed in 1993 to be a hoax, the Mansi photo stands alone as the most credible and important photographic evidence for a lake monster in Champlain or anywhere else. John Kirk, in his book In the Domain of the Lake Monsters, writes that "The monster of Lake Champlain . has the distinction of being the only lake monster of whom there is a reasonably clear photograph. It. is extremely good evidence

Figure 1: The object Sandra Mansi photographed at Lake Champlain. OGamma Liaison/Sandra Mansi

of an unidentified lake-dwelling animal" (Kirk 1998, 133). Joe Zarzynski, author of Champ: Beyond the Legend (1984), calls the photo "the best single piece of evidence on Champ." Another writer says that "By any standard the Mansi photograph remains a genuine mystery and a serious obstacle to any effort to reduce the Champ phenomenon to mundane causes" (Clark 1993, 67).

Despite its notoriety, and inclusion in most books of cryptozoology ("hidden animals"), there has been little skeptical investigation of the monster since the early 1980s. In July 2002, the twenty-fifth anniversary of the Mansi photograph, Senior Research Fellow Joe Nickell and I undertook an extensive investigation of this mysterious monster. His overview of

Champ and our search begins on page 18.

Eyewitness Accounts

Like Bigfoot and the Loch Ness monster, most of the evidence for Champ's existence rests on eyewitness testimony. As I have noted elsewhere (Radford 2002), such accounts are notoriously unreliable and a poor substitute for hard evidence. One writer (Rabbit 2000) listed over a dozen factors that can reduce the accuracy of such accounts, including observer's fear and stress; poor observation conditions; slippage of memory; seeing what the observer wants or expects to see; changing details to conform to other witnesses' accounts; reluctance to admit ignorance; filling in nonexistent details, and so on.

Lake creature sightings are complicated by the fact that it is difficult to judge distances and sizes on bodies of water. As Paul LeBlond of the University of British Columbia's Department of Oceanography points out, "A problem which commonly arises in the interpretation of unfamiliar objects on water is that of determining their size. In the absence of nearby reference features, the eye cannot estimate absolute dimensions reliably" (LeBlond 1982). On land, the human eye and brain can judge spatial dimensions fairly well, comparing an object to a nearby tree, home, or other structure. An unfamiliar object against a visual field such as sky or water, however, can produce very
wildly inaccurate estimates of size and distance.

People often see what they want-or expect■to see. In the case of Champ, the monster's likeness and legend are well-known in the area, and the knowledge that a monster is said to reside in the lake could easily transform an unusual sighting of "something in the water" into a Champ sighting.

The Mansi Encounter

Eyewitness sightings of Champ are relatively rare, and sightings accompanied by good photographs are even rarer. The Mansi family had the remarkable fortune to not only get a good long look at the creature but also photograph it (see figure 1).

According to Sandra Mansi, her family's encounter with Champ took place on Tuesday, July 5, 1977. Sandra and her fiancé Anthony Mansi, along with Sandra's two children from her previous marriage, were taking a leisurely drive along Lake Champlain. They drove by some farmland and, around noon, made their way to a small bluff overlooking the lake. The two children went down to the water while Anthony returned to their car to get a camera. As Sandra watched her children and the lake, she noticed a disturbance in the water about 150 feet away. She thought at first it was a school of fish, then possibly a scuba diver. "Then the head and neck broke the surface of the water. Then I saw the head come up, then the neck, then the back" (Mansi 2002).

Mansi did not panic: "I wasn't even scared, I'm just trying to figure out what I'm seeing. Then when Tony came over the field he saw it and started screaming, 'Get the kids out of the water!'" The kids scrambled up the bank and headed toward the car. As Anthony helped Sandra up the bank, he handed her the camera.

She knelt down, snapped one photo, and then put the camera
Benjamin Radford wrote about Bigfoot in the March/April 2002 issue of SKEPTICAL INQUIRER. His book Media Mythmakers: How Journalists, Activists, and Advertisers Mislead Us will be published in July.

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down to watch the creature. The head and neck turned slightly, then slowly sank into the water and disappeared.
The Mansis estimated that the creature's neck stuck about six feet out of the water and the whole object was about twelve to fifteen feet long. The sighting lasted a remarkably long time-between four and seven minutes-during which time the creature never turned to face the shore. Sandra Mansi described the neck and head as dark in color and said that what we see in the photograph is as much of the creature as she saw.
Despite the substantial weight and credibility given to it by Champ researchers, the Mansi photograph by itself is intriguing but holds almost no value as evidence. There is little usable information revealed in the photograph; whether by accident or design, virtually all of the information needed to determine the photograph's authenticity (and subject matter) is missing, lost, or unavailable. For example, Mansi cannot provide the negative, which might show evidence of tampering (she said she habitually threw away her negatives). She also can't provide other photographs taken on the roll (which might show other angles of the same object, or perhaps "test" photos of a known object from an odd position). Mansi claims to be unable to locate the site of the photo, which would help to determine a number of things, including the size of the object. Furthermore, the photo has virtually no objects of known scale (boat, human, etc.) by which to judge the creature's size or the distance. The fact that the Mansis, allegedly afraid of ridicule, waited four years to release the photo was also seen as suspiis All we are left with is a fantastic story whose only supporting proof is a compelling but ambiguous photograph of something in the water.
The Hoaxing Question
Because of the litany of missing information (and the relatively high quality of the image), suspicions of a hoax surfaced almost as quickly as Champ. Such accusations were summarily dismissed by Mansi family lawyer Alan Neigher, who said that they "could no more have constructed such a hoax than put a satellite in orbit.'
Richard D. Smith, a filmmaker who was producing a documentary on Champ, offered his expert commentary on the matter of a hoax: "As a photographer and filmmaker, I can speak with some authority as to what it would take to fake a picture of this sort. Assuming the remote possibility that the Mansi photo is a fraud, it would require fabrication of an excellent, full-sized model (highly expensive in terms of exper-

tise and materials) which would have to be smuggled out to Champlain or another lake, there assembled or inflated, and successfully maneuvered around out in the water (most difficult, especially with a slight wind blowing), the whole thing accomplished without being seen or the slightest leak in security (unlikely)" (Smith 1984).

This account is nearly comical in its strained assumptions. Smith envisions an "excellent, full-sized model" of the Champ monster, which certainly is unlikely. But the Mansi photograph doesn't show an "excellent, full-sized model" of Champ; it simply shows a dark, featureless, ambiguous curved form of unknown size in water. Surely such an object would not be as difficult to fake as Smith presumes.

However far-fetched some of the hoax dismissals are, I believe they are fundamentally correct. After an exhaustive and detailed review of both her account and photograph, I am willing to grant that she is probably a sincere eyewitness reporting essentially what she saw. Assuming that both the account and photo are truthful (though error-prone) records of something in the water, what can we conclude about it? Several examinations have been done.

The Frieden Analysis

In 1981, B. Roy Frieden, of the Optical Sciences Center at the University of Arizona, examined the photograph at the behest of Champ researcher Joe Zarzynski. Frieden's findings were published in Zarzynski's book as Appendix 2.

Frieden believes the picture to be a valid print, and finds no evidence of photographic tampering. He does find a "suspicious detail" in the picture: "When I showed it to a woman who formerly lived at Lake Champlain, she immediately noticed a brownish streak going horizontally from left to right across the picture right up to the object in question. She right out said that it looked to her like a sand bar" (Frieden 1981). Frieden believes that the streak is "a real detail in the picture," and
suggests that if it is a sand bar, "then there is a distinct possibility that the object was put there by someone the sand bar problem really has to be investigated."

The LeBlond Analysis

Another analysis was conducted by Paul H. LeBlond of the Department of Oceanography at the University of British Columbia. LeBlond (1982) attempted to use the general appearance of the water's surface to estimate the length of the waves, and in turn use that as a scale by which to measure the object in the photograph. After a list of the many possible sources of error, LeBlond summed up: "The inescapable conclusion [despite all the unknowns] is that the object seen in the Mansi photograph is of considerable size" (he estimated between sixteen and fifty-six feet long).

LeBlond used a complex formula involving wind speed, fetch, wave period, and wave height-all of which were estimated. LeBlond did his best with what scant information
he had to work with, but no matter how good the math or model

is, with so many estimated variables it is apparent that any result will be little better than a wild guess. LeBlond's analysis, by his own admission, was fraught with many unknowns: "Sources of error may appear at many stages of the estimation method, and this must be kept in mind when interpreting the results."
Most writers who mention the LeBlond analysis fail to include this important caveat, instead portraying his results as conclusive and scientifically sound. One writer, John Kirk, goes so far as to say that LeBlond's heavily qualified conclusions "destroyed the learned academic's [i.e., Frieden's] hypothesis that the animal could have been a fake" (Kirk 1998, 135).
Other cryptozoologists, it should be noted, were more cautious about the results. J. Richard Greenwell, of the

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International Society of Cryptozoology, discussed the various analyses and their conclusions that "there are 'definitely no cuts, no superimposition,' but, he warn[ed], that 'does not mean it is a monster or a living object. It does mean an object was there and was photographed"" (Greenwell 1981).
There is one area where LeBlond's discussion is clearly wrong. He mentions the efforts to locate the Mansi site, and provides a map with a shaded area showing "stretches of shoreline from which the Mansi photograph may have been taken." The areas highlighted are on the western shores of Hog Island and below Maquam Bay across from Hero Island. Yet only someone who had never been to the area could suggest these sites as possible candidates; in that area, the far (eastern) shores are much too far away to possibly be depicted in the Mansi photograph.

The Radford Analysis

In my own analysis of the Mansi photograph, an odd thing about the subject emerged. It is not apparent at first glance, but the "head" and "hump" are not clearly connected. If the photograph truly does depict the hump and neck of a lake monster, the actual body contortion is very unusual and unlikely for nearly any type of living animal. To see why, notice that the neck portion does not align with the hump. The neck in fact emerges out of the water from the left side of the photograph, away from the hump (and supposed body; see figure 2).
The reason that the head and hump seem connected is that there is a dark patch in the water between the two. I suggest this is in fact a shadow from the head. In the photograph, that area is not nearly as dark as the head and hump, and has all the characteristics of a shadow. Furthermore, Mansi's own account corroborates the shadow hypothesis: She claims that the photo was taken around noon. If this is true, then the sun should be directly above, hitting the top of the head and casting a shadow downward-right where the neck and hump meet.'
Even if the neck and hump are part of the same object, the positioning of the segments makes it very unlikely it is a living

creature's "head" and "neck" connected just under the water. Since the head is dark and foreshortened, there is no way to tell if the head is in fact a stubby end as pictured, or perhaps a gnarled tree root branching away at an angle.
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Figure 2: The object Sandra Mansi photographed at Lake Champlain in 1977, traced from an enlargement. Illustration by Benjamin Radford.
Figure 3: Photograph of the author in a field experiment at Lake Champlain. A one-foot scale marker is photographed at 150 feet. Using that scale, the alleged lake creature Sandra Mansi photographed in 1977 can be measured.
Several attempts were made at estimating the object's size (Mansi said twelve to fifteen feet; LeBlond suggested sixteen to fifty-six feet). If valid, these large estimates would suggest a lake monster, but these measurements were very indirect and fraught with error. There is, however, a more accurate and direct way of determining whether or not Sandra Mansi's account of her sighting matches with the photographic evidence she provides.

Replicating the Mansi Photograph

Many armchair analyses had been conducted to determine the size of the object, with little solid results. The lack of reference objects and known distances make the task formidable. However, the analysis can be approached from a different angle: Though we don't know the absolute size of-and distance to-the object, we do know what Sandra Mansi reported as the size and distance. With those variables fixed, it is then a fairly straightforward process to determine if the object is the size she (and others) say it is.
In order to help judge the validity of the Mansi photo, we visited Lake Champlain to do field work and original experiments. Following an unfruitful attempt to locate the exact original site, we chose a spot on Lake Champlain in the general area. Joe Nickell stood approximately eight feet above the waterline; this height is similar to that reported by Sandra Mansi (kneeling down atop a six-foot ledge).
I entered the lake holding a three-foot, black-and-white scale marker, measured off in one-foot lengths. Photographs (using the same type of camera Mansi used in 1977-a Kodak Instamatic, fixed-focus 110) were taken at fifty foot intervals ending up at 150 feet from shore (see figure 3). The distances were measured directly, calibrated using a synthetic string to avoid any stretching in the water."
With the camera at the height Mansi claimed (about eight to nine feet), and the marker in the water at the distance she claimed (150 feet), this should allow us to measure the size of an object in that scale. Any object of a claimed size at a certain distance (at a given focal length) will take up a given measurable space in the print. I measured the size of the one-foot scale

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Figure 4: A six-foot-tall creature "neck" at 150 feet from the camera. If the estimates given by Mansi are correct, her photograph and this one should look very similar in terms of height above the waterline. (Since the neck was the only dimension being measured, the hump and head portions were excluded.)

at 150 feet on our photograph, marked that, and transferred the measurement to the Mansi image scaled to the same size.

For comparison, rather than use the most commonly seen version of the photograph, I traveled to Connecticut to study the rarely seen original print. I carefully measured the Champ object in comparison to the whole photo, not the magnified and cropped commercial version that appears in books and magazines (and is necessarily reproduced here).

Unfortunately for those claiming that the Mansi object is huge, the numbers don't add up. All of the previous estimates of the object's size were dramatically overstated. The "neck" is nowhere near the previous estimates of six to eight feet or more; instead, the object is just over three feet out of the water, and both segments together are about seven feet across.

In order to double-check the results I also worked backward, using a photograph of a mock Champ neck and head held six feet above the water at 150 feet (see figure 4). If Mansi's estimates are correct, the neck height in her photo and ours should look very similar. Using that scale for measurement, I verified that my estimate was indeed accurate.

Note that my analysis is based upon Sandra Mansi's own estimates and testimony. Because the object in the photo is inconsistent with the claimed height, those who wish to maintain that the object is six feet or taller (and fifteen feet or longer) will have to decide which parts of Mansi's story they think are false (or inaccurate). There is no way to be sure exactly how large the object is, but estimates of the distance and the size cannot both be correct; either-or both-are wrong.

At least one researcher, J. Richard Greenwell, has examined the photo and believes that Mansi's 150-foot distance estimate is correct: "we concluded that that object, whatever it is, was there in the lake at that estimated distance" (Greenwell 1992).

The most likely explanation is that Mansi simply thought the object was bigger than it was. This effect is well known to be a factor in eyewitness reports; Joe Zarzynski himself warns about it: "many estimates of length tend to be overstated" (Zarzynski 1987, 109). Yasushi Kojo, another Champ researcher, also states that "the sizes of the animals are frequently overestimated in sighting reports" (Kojo 1991).

'This revelation sheds a whole new light on the object in the Mansi photograph; with the size approximately half that of all previous estimates, the range of possible candidates becomes far larger-including perhaps a large bird, known animal, or a floating tree stump. The revised size is also inconsistent with many Champ descriptions. If the main eyewitness is to be believed, this "extremely good evidence" for Champ (and, by extension, other lake monsters) is even weaker than previously suspected.

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Notes

1. In his book Zarzynski admits that the head and hump are not obviously connected. He does, however, show an "electronic heavy enhancement of the Mansi photograph demonstrating 'that the monster's back and head are connected."" I remain unconvinced; the "heavy enhancement" seems to have done little but emphasize the dark patches-which would of course include the head's shadow.
2. Nickell also took duplicate photos with his own 35 mm camera (published here at full size). For comparison, we verified that both cameras were of the same focal length.
3. An examination of the original print of the Mansi photo is helpful but not essential for this analysis. A less accurate comparison using the least-cropped publicly available version of the photo (in the April 1998 issue of Discover magazine) yields a neck height of about four feet.

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